could be given more usefully to another. As to the general character of the book under review, we have failed to discover anything very original in its treatment of the subject, but it seems to be a thoroughly safe and trustworthy guide.

(2) This volume (the first of two parts) is for use in Realschulen and Gymnasien. It is divided into sections. There is one on descriptive and practical chemistry which covers 100 pages, including ten pages on technical processes, one of forty pages on mineralogy, including eight on crystallography. There are about thirteen pages on geology, three pages describe experiments on vegetable physiology, and the last forty pages are devoted to object lessons on topics which range from Scheele's discovery of oxygen to the growth of coral islands. The book is well printed on good paper, illustrated by excellent drawings, and compiled with evident care. It is also, in a sense, a practical manual, the first section being interspersed with a variety of simple chemical experiments. Yet in spite of its attractive appearance it is a satisfaction to think that such a book would find no place in any school in this country. Its defect is diffuseness, especially in the latter sections. We can form a pretty clear notion of the effect of a course of this kind on an average boy or girl. They would have absorbed a number of scientific names, have formed a hurried acquaintance with different kinds of apparatus, remembered several chemical formulæ; they would describe the six crystallographic systems, and talk about sedimentary and igneous rocks; but their knowledge would be a kaleidoscopic assortment of ideas which could produce no sharp and permanent impression, and would do little to stimulate a living interest in the things about them.

Whatever shortcomings our systems of science teaching may possess, we do not set schoolboys and girls, who are old enough to study science seriously, to nibble at a scientific scrap-heap. They may do that as much as they please out of school, and perhaps the more they do it the better; but in school the process with older children must be methodical and thorough, and not superficial and diffuse, and should leave the boy or girl with a solid foundation to build upon.

(3) The authors state in their preface that "it was with the idea of presenting in the simplest manner the facts of organic and physical chemistry which have an essential bearing on medical science that the present work was written." There is no doubt that in the present state of organic chemistry a process of judicious selection for special needs is not only desirable, but imperative. Like the botanist, one has to transplant typical specimens into trim little beds where they can be examined individually without the brain becoming bewildered by an endless and varied flora. Thus the authors have emphasised those facts which have a special relation to physiology and pharmacy, and have suppressed matter which they consider of less importance, and have done it with considerable judgment. Whether they have succeeded as well with the few brief references to physical chemistry is doubtful, the space allotted being altogether inadequate for even an elementary exposition of the subject.

We would direct the authors' attention to the following errors which have been noted in glancing through the book. Amyl and ethyl nitrite are not usually described as "nitro" compounds (p. 162); no distinction is drawn between the metallic derivatives of glycol and glycollic acid, both being described as *glycolates* (pp. 142 and 166); racemic lactic acid is not indicated by "*i*," but by "*r*" (p. 169); *nitrobenzlidene* is wrongly spelt (p. 195); *purine* is not the atomic framework, but the mother-substance of the uric acid group (p. 204); there is a step missing in Traube's synthesis of uric acid (p. 201); and the formula for safrole is wrong (p. 316).

(4) This book is intended for those who are not professed chemists, but are interested in the related sciences of physics and chemistry. It is a clear and concise exposition of the subject, a sort of abridged Werner's "Lehrbuch," and will no doubt fulfil the purpose for which it was compiled. Satisfactory as the book is in many of its essential features, it reveals a curious ignorance on the part of its author of much of the recent work on stereochemistry published in this country. We have noted the following more important omissions. There is no reference to McKenzie's researches on asymmetric synthesis, or to Patterson's work on the activity of substances in solution, or to his recent paper on "Optical Superposition," or to Kipping's synthesis of optically active silicon compounds. A book which ignores, whether by accident or design, contemporary research cannot be regarded as an entirely trustworthy guide. J. B. C.

## *OUR BOOK SHELF.*

*The Animal Mind. A Text-book of Comparative Psychology.* By Dr. Margaret Floy Washburn. Pp. xi+333. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1908.) Price 7*s*. net.

This book is the second volume of a series to be devoted to animal psychology, under the title of "The Animal Behaviour Series." The first volume—"The Dancing Mouse," by Dr. Yerkes, recently reviewed in these pages—was an exposition of the different experimental methods applicable to the investigation of the psychology of one particular animal. Miss Washburn's book likewise follows the experimental method, and aims at presenting concisely the facts and principles that have emerged as the result of the application of this method during the last ten or twenty years to the study of different forms of animal behaviour.

Starting with a general statement of the difficulties and limitations inherent in the science of comparative psychology, the author proceeds to give a somewhat brief yet penetrating and concise discussion of the problem of inferring mind from structure and function respectively. Miss Washburn's conclusion is so typical of her general attitude throughout the book that it may well be quoted here:—"We can say neither what amount of resemblance in structure to human beings, nor what speed of learning constitutes a definite mark distinguishing animals with minds from those without minds, unless we are prepared to assert that only animals which learn so fast that they must have memory ideas possess mind at all. And this would conflict with the argument from structure. For example, there is no good experimental evidence

© 1908 Nature Publishing Group

that cats possess ideas, yet there is enough analogy between their nervous systems and our own to make it improbable that consciousness, so complex and highly developed in us, is in them wholly lacking."

There follows on this a very full and admirably lucid description of the investigation of sensory discrimination, space perception, and higher forms of consciousness in the various classes and orders of the animal kingdom—methods and results being in every case given in connection with the names of the investigators and references to their works. These references, by the way, nearly five hundred in number, are collected at the end of the book, under the heading "Bibliography," and greatly enhance the value of the book to the intending research student.

Two chapters are devoted to the consideration of the processes of learning in animals. The subject is as difficult as it is important, which perhaps justifies the author's attitude of extreme caution, apparent throughout the discussion. The account is descriptive rather than critical. For example, the conflict between the results of Thorndike and Hobhouse respectively in their experiments on cats and dogs is indeed stated but not discussed. The closing chapters on the memory idea and attention are full of interest, and really come to close quarters with the vexed question of the relation of animal to human intellect.

Psychologists will be unanimous in their gratitude to Miss Washburn for the very thorough way in which she has accomplished her task.

William Brown.

*Natur-Urkunden.* By Georg E. F. Schulz. Heft 1. Vögel. Erste Reihe. Pp. 20, with 20 plates. Heft 2. Planzen. Erste Reihe. Pp. 16, with 20 plates. Heft 3. Planzen. Zweite Reihe. Pp. 16, with 20 plates. Heft 4. Pilze. Erste Reihe. Pp. 16, with 20 plates. (Berlin: Paul Parey, 1908.) Price 1 mark for each part.

Various books on birds by Messrs. Kearton, and others on natural history, including a miniature series that has attained a wide circulation, have served to indicate how suitably photographs from the life may be utilised to illustrate books on botany and zoology. A very charming series of this kind is now being issued by Messrs. Paul Parey under the title of "Nature Records"; they are being entirely prepared as to photographs and text by Mr. G. E. F. Schulz. The volumes will deal with both branches of natural history. Of the first four, two are devoted to wild plants and a third to fungi. It will be recognised that, owing to their low growing position, size, and tendency to movement, it requires great care and skill to photograph plants as they grow. However, Mr. Schulz is not content to take his photographs under the easiest conditions, but has been at considerable pains to record special phases, such as the open flowers of *Silene noctiflora* and the rain-flecked leaves of *Aira canescens.* Among the illustrations of fungi, one of the best, representing *Boletus scaber,* shows even part of the hymenophore.

Difficult as it must have been to secure these plant photographs, some of the studies of birds in the first part must have required even greater skill and patience. There is a delightful picture of the parent tern holding a small fish while one youngster tries to gobble and the other cries lustily. The turning of the eggs in the nest is shown both for the seagull and the avocet. Altogether the volumes cannot fail to meet with the admiration of all "nature-lovers." Inasmuch as the records are taken at random, the series is intended primarily for the *dilettante,* but the author's notes are full of nature knowledge that may be recommended to teachers of nature-study and others who are not too old to learn. It is to be hoped that the early parts will have a ready sale, as in these circumstances the series will be continued.

*A Pocket Handbook of Minerals.* By G. Montague Butler. Pp. ix+298. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1908.) Price 12*s.* 6*d.* net.

Every student of mineralogy knows how difficult it is to acquire facility in identifying minerals off-hand. It is with the view of assisting the student, the miner, and the collector in determining his specimens that this little work has been prepared. It has no pretension to be a manual of mineralogy, even of an elementary character, but it is simply a book for the pocket, to be used as a work of ready reference. For this purpose it seems well adapted. The mineralogist finding an unknown or doubtful mineral may turn to it for assistance, much in the same way that a botanist would use his flora. Chemical and crystallographic characters are deposed from the supreme position which they usually occupy, and attention is directed rather to obvious physical characters, which in some cases appear even trivial, but are yet of diagnostic value. The most characteristic features of a mineral are emphasised by being printed in thick type so as to catch the eye. At the end is a rather ingenious scheme, forming a kind of artificial key for the identification of an unknown species. There is also a glossary, which seems to have been prepared with care.

As the book is likely to be used by the prospector, the commercial element is not ignored, and tables are introduced giving the value of metals, useful minerals, and especially gem-stones. It is notable that space for notes is left here and there in the book, a feature which, though increasing the size of the volume, is likely to be of service in the field; thus a description of moonstone in less than half-a-dozen lines occupies an entire page (p. 136). We have not noticed many printer's errors, but the name of the mineralogist who suggested the scale of hardness was Mohs, not Moh, as printed twice on p. 290.

*La Lutte contre les Microbes.* By Dr. Etienne Burnet. Pp. ix+318. (Paris: Librairie Armand Colin, 1908.) Price 3.50 francs.

In this book a very readable account is given of certain diseases of microbic origin, of the parasites producing them, modes of transmission, and methods of treatment and prevention. Cancer is first dealt with, the author evidently inclining to the view that this disease is due to a micro-parasite, transmitted perhaps by food and by insect parasities, which we think is probably not the case. The statistical part of this section is a useful summary of data concerning the frequency of the disease, cancer houses and districts, &c. After cancer, tuberculosis, tetanus, sleeping sickness, intestinal infections, and small-pox and vaccinia are dealt with, and with these the author is on less debatable ground, and a good summary of our knowledge of each is given. The volume concludes with a translation of Jenner's researches on the causes and effects of cow-pox. R. T. Hewlett.

*The Farm shown to the Children by F. M. B. and A. H. Blaikie.* Described by Foster Meadow. Pp. xii+91. (London and Edinburgh: T. C. and E. C. Jack.) Price 2*s.* 6*d.* net.

This attractive little volume contains a great deal of information about farming, expressed in a very simple manner. Its forty-eight coloured pictures are sure to please children greatly, and the book, as a whole, is well calculated to arouse an interest in agricultural pursuits.

© 1908 Nature Publishing Group